

$\rho 14 \ Z(ee) + Jets$

- Based on 219 pb⁻¹ of delivered lumi (19 April 2002 - 7 Sept 2003 / run range: 151817 - 180956)
- CSC's 1EM loose skim: (|ID=10 OR |ID|=11) AND (|pT|>15GeV)
- ✓ ATHENA root tuple
- ✓ Good event selection:
 - ✓ Jet/MET v5.0 list of bad LBNs
 - ✓ CAL, SMT, CFT based on runquality database
- ✓ Checking for event duplication
- ✓ DiEM triggers:
- 2EM_HI = CEM(2,10) L3(loose, 1, 20) for triggerlist \leqq v11
- E1_2L20 = CEM(1,11) L3(loose, 2, 20) for triggerlist v12
- ✓ Luminosity:

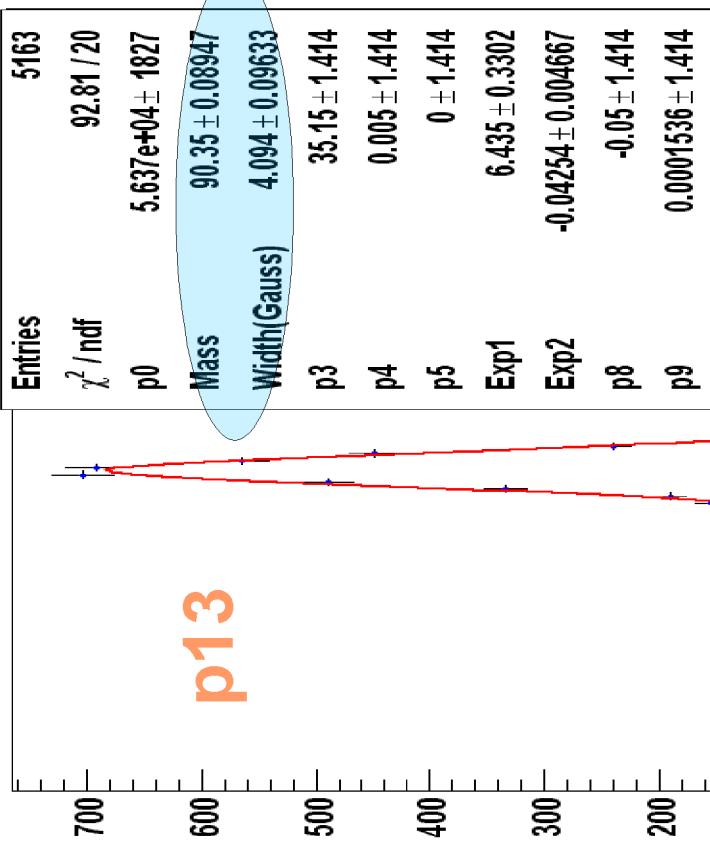
	2EM_HI	E1_2L20	Sum
delivered	172pb-1	47pb-1	219pb-1
recorded	143pb-1	44pb-1	187pb-1
recorded w/o bad LBNs	126.31pb-1	42.39pb-1	168.7pb-1
reco'd w/o bad LBNs	126.03pb-1	42.38pb-1	168.41pb-1

Electron and Jet selection

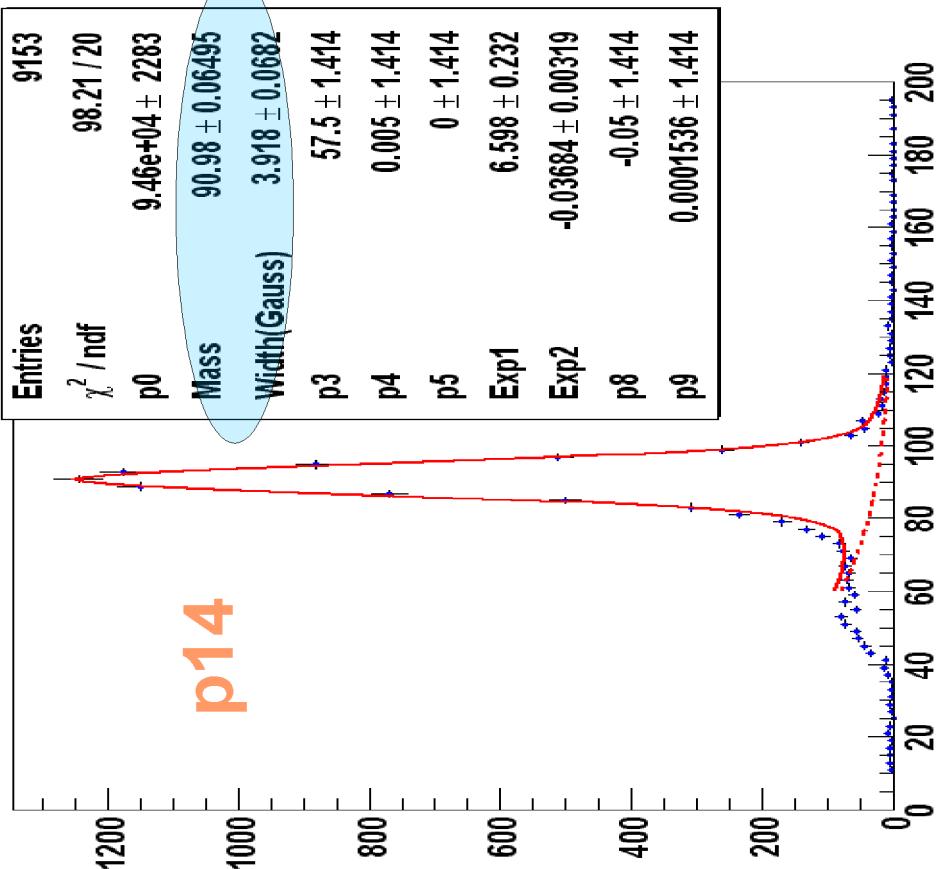
- **Electron selection:**
 - EMF>.9
 - Iso<.15
 - Hmx<20.
 - pT>20GeV
 - Including phi cracks
 - CC-CC: $|\eta| < 1.1$
 - Requiring at least one trackmatched electron
 - $80 \text{ GeV} < M_{e_e} < 100 \text{ GeV}$
- **Jet selection:**
 - .05<EMF<.95
 - Chfrac<.4
 - HotFrac<10.
 - N90>1
 - L1 confirmation
 - $dR(\text{Jet-EM}) > .45$
 - $pT > 20 \text{ GeV}$

Z peaks (p_{T3} vs p_{T4})

dilem invariant mass (1 track)



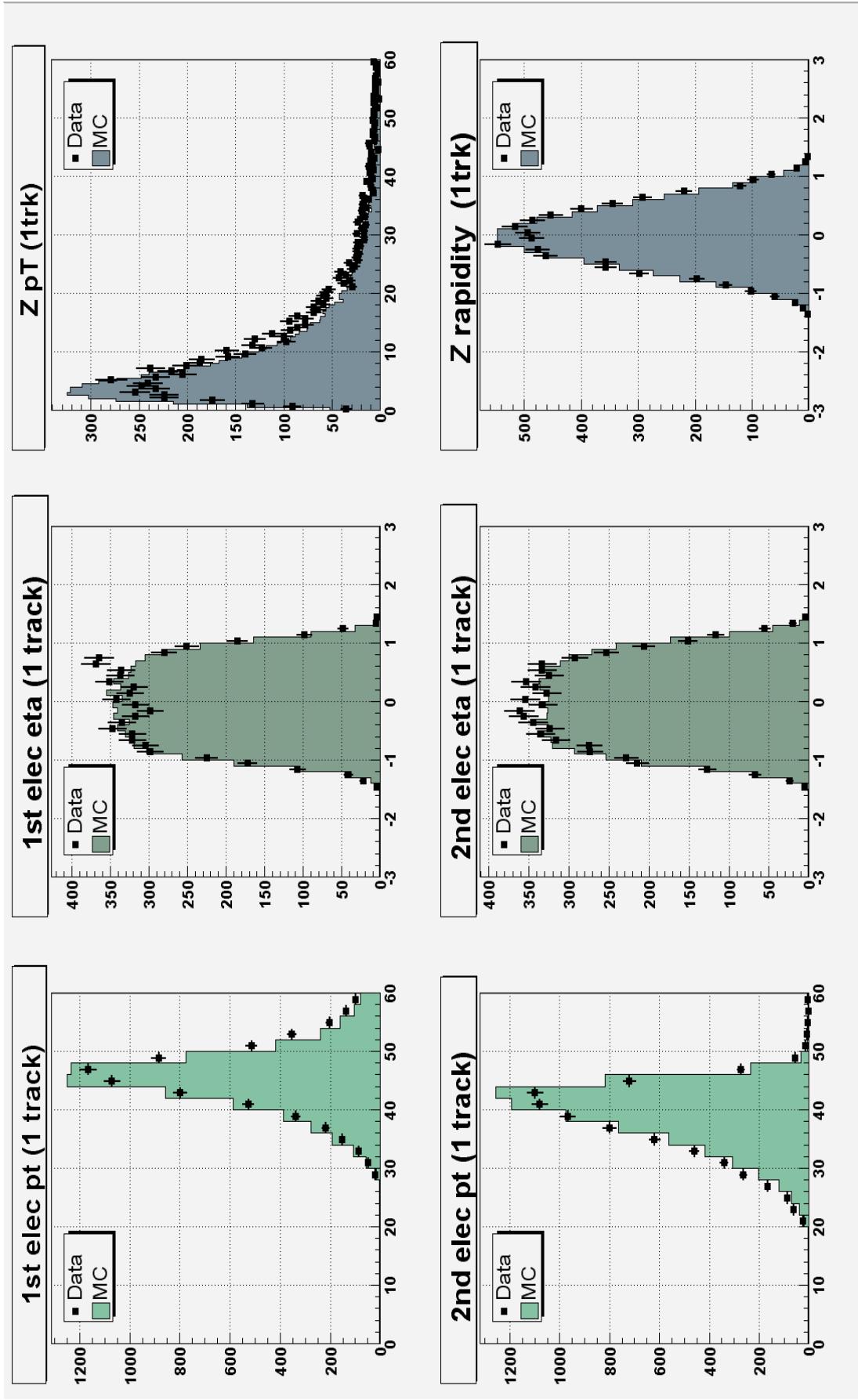
dilem invariant mass (1 track)



p13

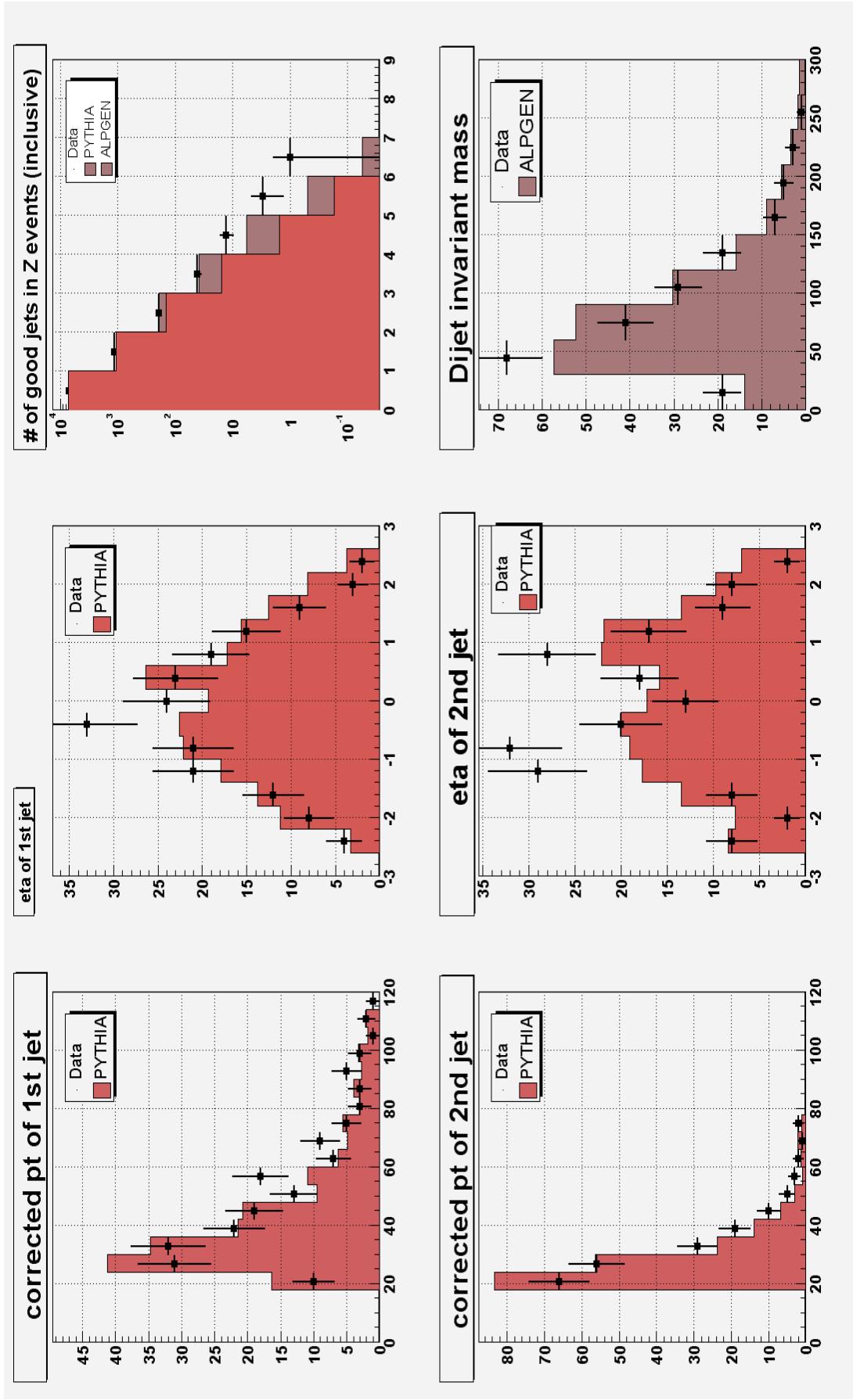
p14

Electrons in Z candidate events (ρ 14 data vs PYTHIA MC)



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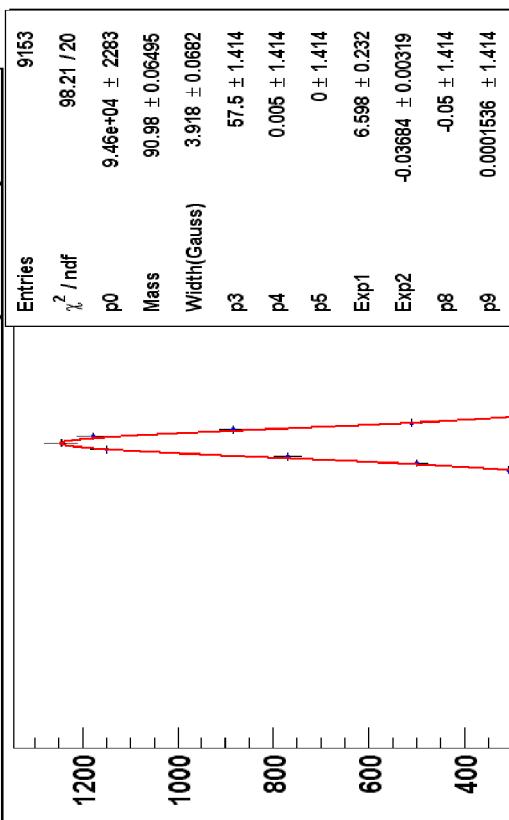
Jets in Z candidate events (p14 data vs PYTHIA/ALPGEN MC)



QCD background

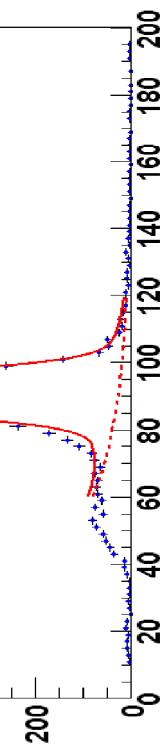
- Using MC to determine fraction of DY in Z/Gamma* → ee: **2.3%**
- Fitting exponential and convolution of Gaussian & BW to diem invariant mass plot to separate pure Z->ee from DY+QCD

diem invariant mass (1 track)



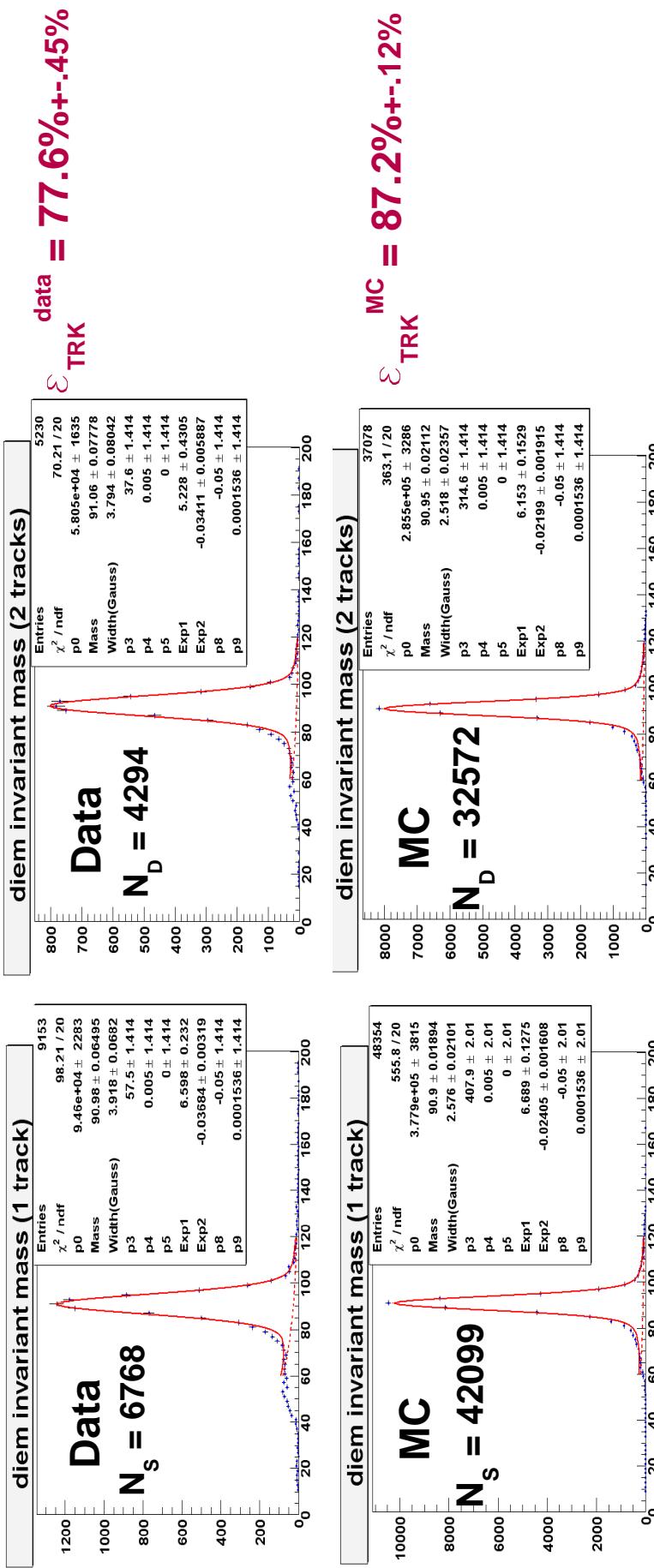
Total # of events (80-100GeV) = **7041**
from QCD and DY (80-100GeV)= 273

=> **Signal** = **Z + DY** = **6927 +/- 86**
Background = QCD = **114 +/- 21**



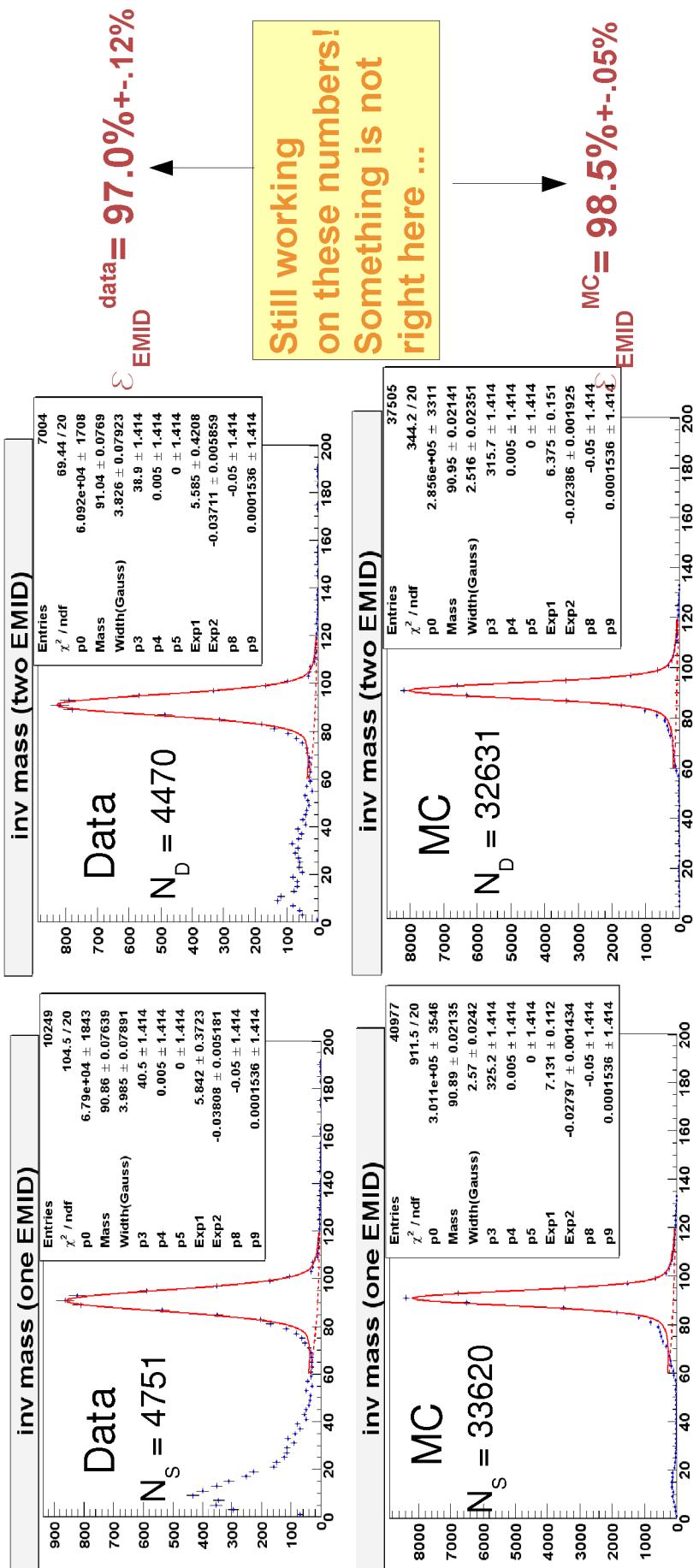
Trackmatching/finding efficiencies in data and MC

- N_s = # of events with 2 trk matches
- N_d = # of events with at least 1 trk match
- Efficiency = $2N_d/N_d + N_s$
- Fit: Gaussian+BW for signal and exponential(data)/linear function (MC) for background



EMID efficiencies for data and MC

- N_s = # of events where 2 EM objects pass EMID cuts
- N_D = # of events where at least one EM object passes EMID cut
- Efficiency = $2N_D/N_D + N_s$
- Fit: Gaussian+BW for signal and exponential(data)/linear function (MC) for background



Z(ee) + X Cross Section

$$XSection \cdot BR = \frac{N - B}{Lumi \cdot Trigger \cdot Accept \cdot Trk \cdot EMID}$$

	Value	Uncertainty	
N-B	6927	86	
Lumi	168.41pb-1	10.09pb-1	
A	22.1%	0.08%	
ϵ_{EMID}^{data}	84.3%	0.5%	
ϵ_{EMID}^{MC}	98.5%	0.05%	
ϵ_{track}^{data}	77.6%	0.45%	
ϵ_{track}^{MC}	87.2%	0.12%	
$\sigma \times BR$	282.5pb	7.7pb (stat)	

$$EMID = \frac{\epsilon_d^2}{\epsilon_{MC}^2}$$

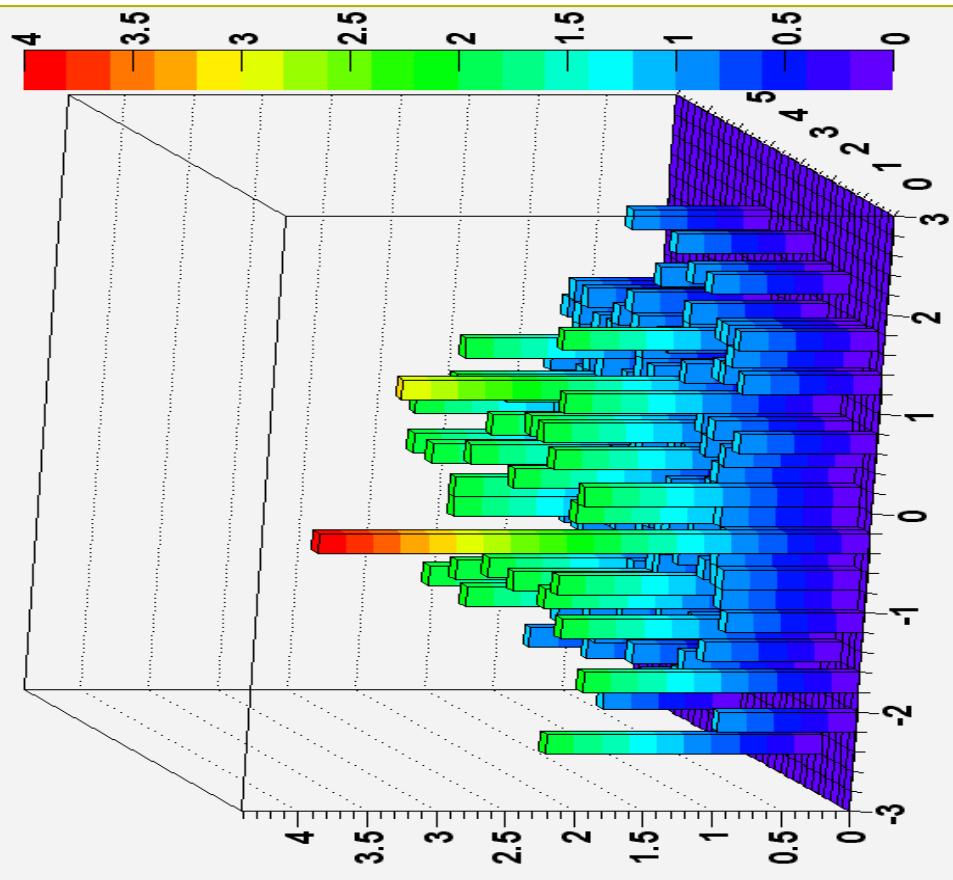
$$Trk = \frac{2 * \epsilon_{data} - \epsilon_{data}^2}{2 * \epsilon_{MC} - \epsilon_{MC}^2}$$

This is preliminary !!!
 I stole the data EMID number from the
 WZ group.
 Some MC factors are still being
 looked at.
 Trigger efficiency is missing.

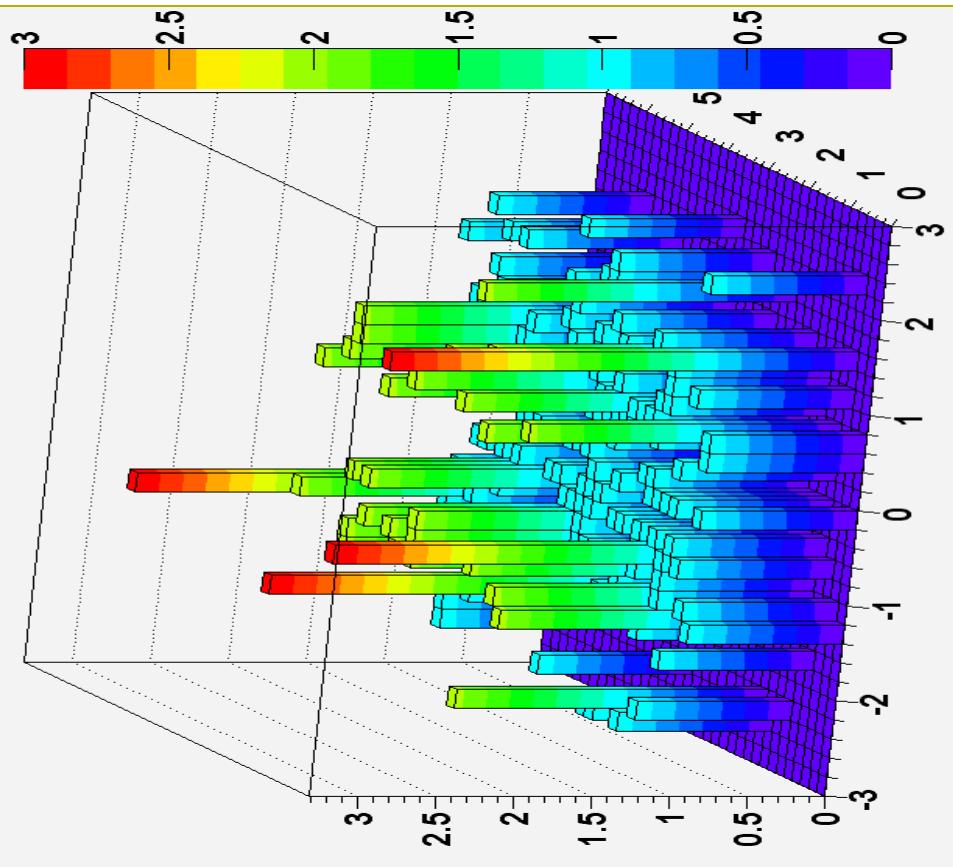
Todo

- Resolve issues with correction factors
- Smear MC electrons
- Trigger efficiency
- Jet Reco/ID efficiency
- Recalculate efficiencies with jets

1st jet phiyeta vs phiphi



2nd jet phiyeta vs phiphi



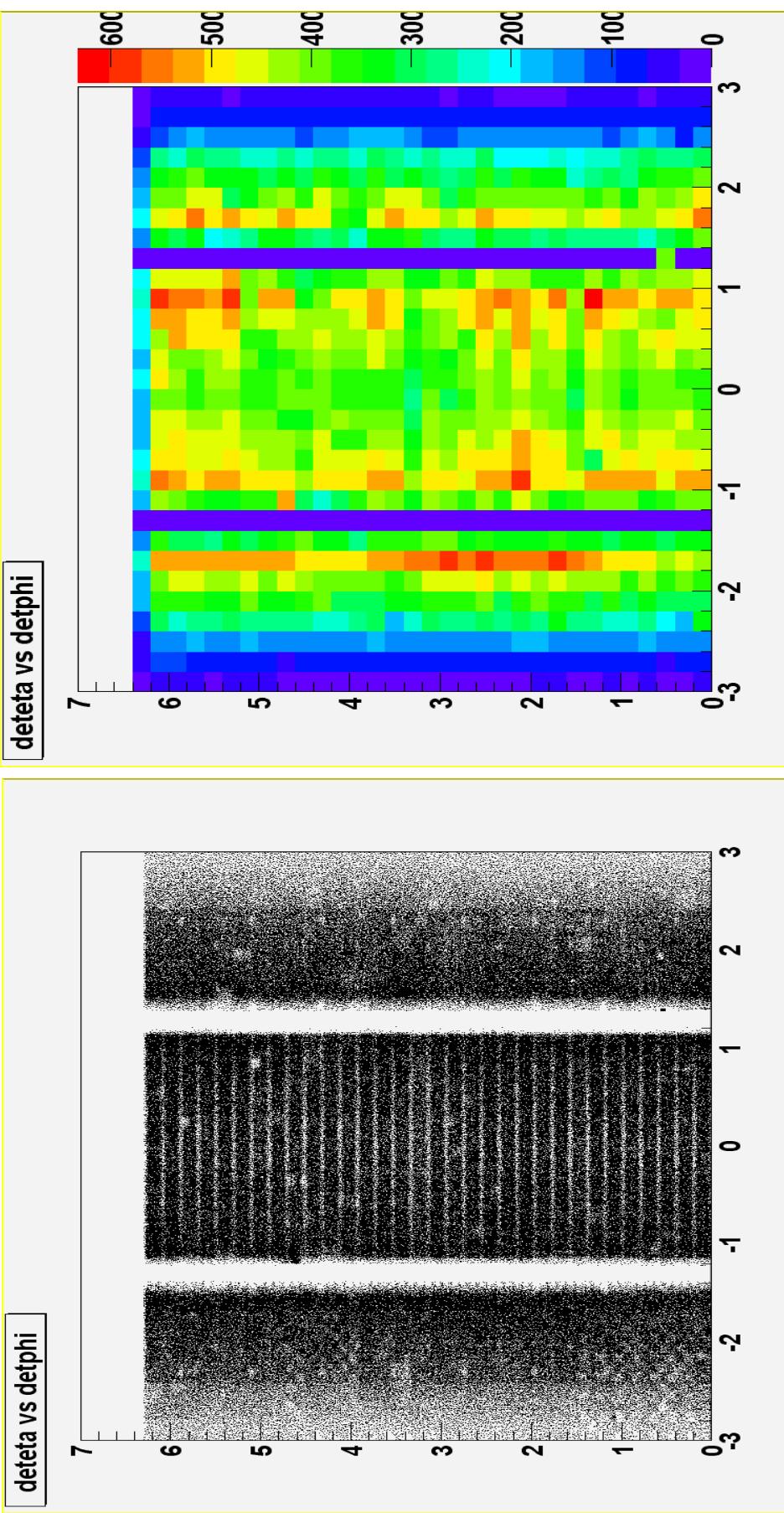
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Bookkeeping information

- 520 million events to tape
- 74 million in 1EM loose skim
- 8.793.039 events in ATHENA root tuple format
- Duplicate events = 340.144
- Events rejected due to Jet/MET bad LBNs list = 321.803
- Events rejected due to bad CAL run = 674.717
- Events rejected due to bad SMT run = 345.903
- Events rejected due to bad CFT run = 13.385
- Events passing trigger selection = 1.545.441
- Events selected for analysis = 1.312.303
- Events with Z candidates = 7.041
- Z candidate events with dijets (inclusive) = 194

CAL



All electrons passing EMF, Iso, HM_X, pT cuts - no fiducial cuts
- rejecting bad events (Jet/MET, CAL, SMT, CFT)

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